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BioEnergy International, LLC. a Biorefinery Company

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BioEnergy International, LLC

a Biorefinery Company

Umass TIMBR Cellulosic Conference
September 19, 2008

Management Team, BioEnergy's X Factor



Stephen J. Gatto, Chairman, CEO
Advisor to President Clinton and Bush

Dr. Lonnie Ingram, Chief Science Officer
University of Florida

Dr. Joseph P. Glas, SVP R&D
VP DuPont Biotechnology

Dr. Mohammed Moniruzzaman, VP R&D
Genencor International

Samuel McConnell, SVP Development
Project finance over \$2 B

Rudy Fogleman, VP Operations
Commercial ethanol plant experience

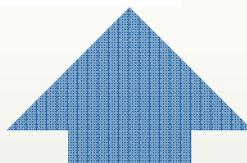
Experience
Proven track record
Recognized worldwide



President Bush on BioEnergy's Chief Science Officer:

"on the leading edge of change"

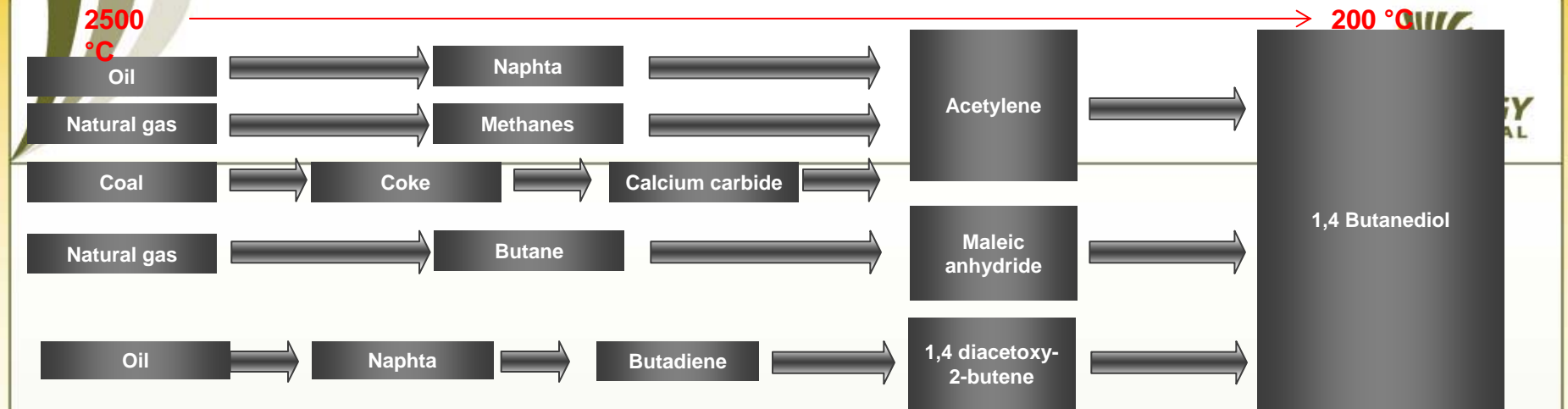
Our Vision - the BioRefinery



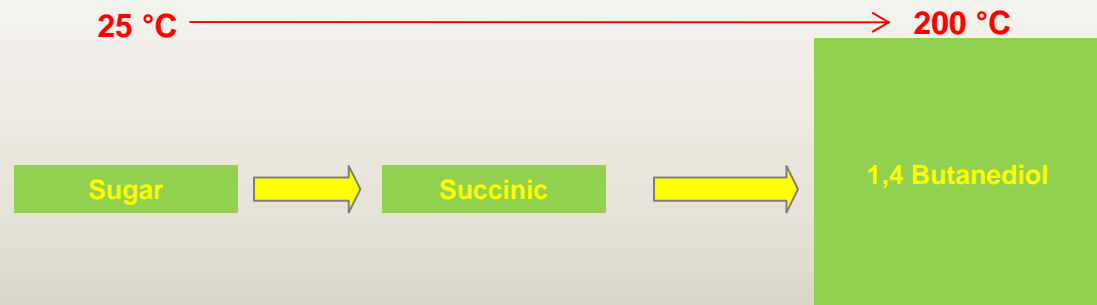
A Day When A Pound Of Sugar Can Replace A Barrel of Crude For Everything From The Fuel We Put In Our Cars To The Plastics and Fabrics We Use In Our Everyday Lives .



Today's oil and gas bases technology



BioEnergy's second generation technology – 3 years from today



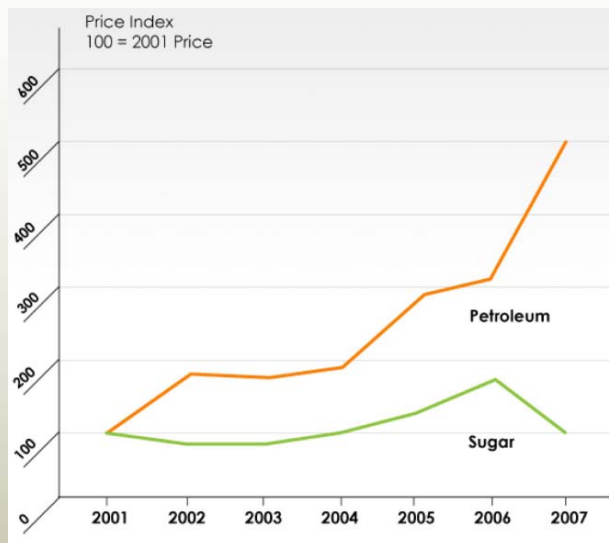
BioEnergy's second generation technology – 7 years from today



BioEnergy's margin comparison



Biorefinery concept links low cost feedstock approach with high value outputs



Source: EIA World Crude Oil Price; USDA Raw Sugar Price

Feedstock	Cost of Sugar (\$ / lb)	Ethanol Gross Margin (\$ / lb sugar)	Bio-polymer Gross Margin (\$ / lb sugar)
Corn	\$0.08-0.17	\$0.01-0.10	\$0.51
Sugar Cane	\$0.08-0.10	\$0.08-0.10	\$0.58
Cellulosic	\$0.03-0.08	\$0.10-0.15	\$0.60

The focus is on diversifying plant revenues while building the sustainable sugar platform.
Cellulosic technology is not the end game;
rather it is a means to an end.

The Market



Biofuels

→ 90 billion gallons

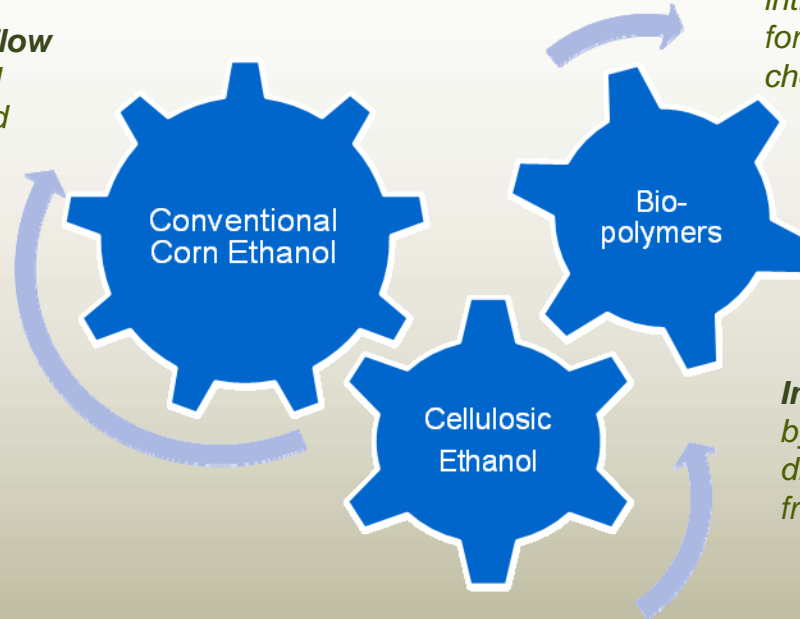
Bio-based chemicals and polymers

→ 350 billion pounds

The Strategy



Secure cash flow
from traditional
corn plants and
cheap sugar
platforms

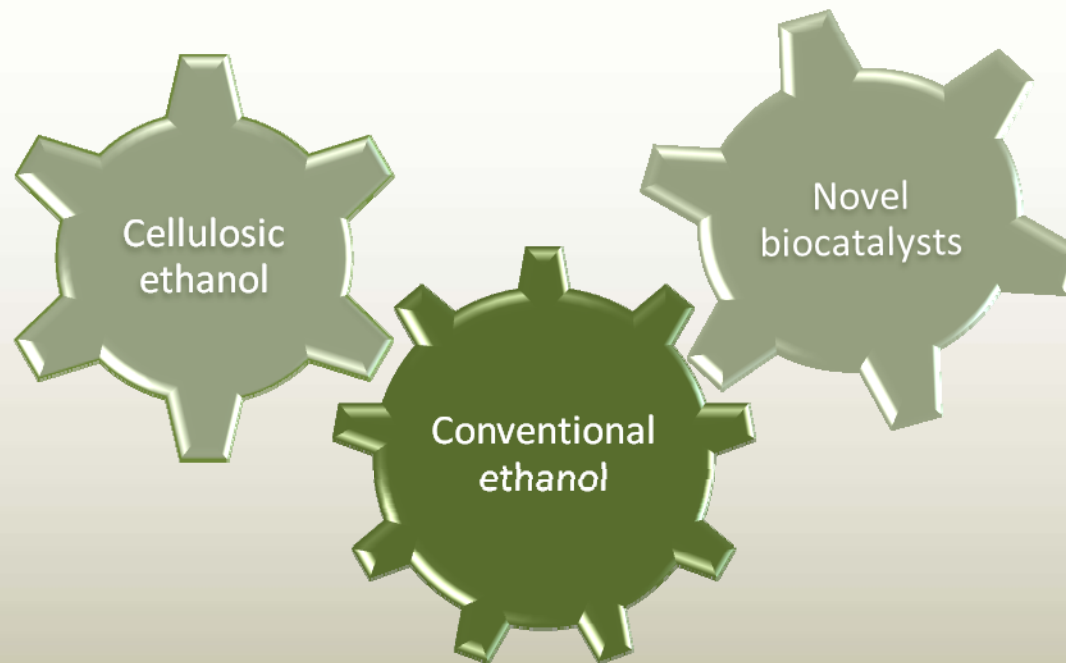


Diversify revenue by
introducing novel biocatalysts
for the manufacture of green
chemicals and biopolymers

Integrate cellulosic technology
by retrofitting or building plants to
drive down costs and move away
from food-based raw materials

New Paradigm needs a Beginning, Middle and End

Business Overview



Our strategic business model is supported by proprietary technology; BioEnergy is a leader in the new industrial revolution.

Biorefinery Platform Cellulosic Destination Sites



Clearfield, Pennsylvania



- 110Mgpy, Fagan EPC; ICM Design
- 5-year off-take agreement with Getty Oil (provides natural hedge against commodity fluctuations)
- \$22M in grants and loans from State of Pennsylvania
- Closed \$205M debt financing with WestLB, TD Banknorth & Stern Brothers Feb '08
- Design underway for co-location of pilot plant

Biorefinery Platform Cellulosic Destination Sites



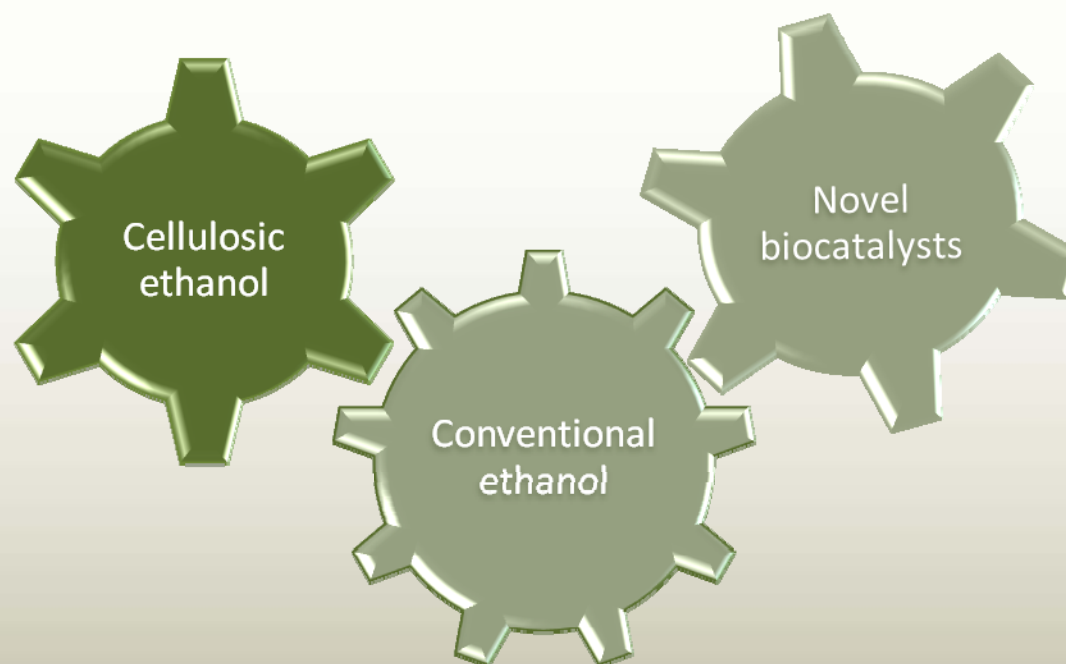
Lake Providence, Louisiana



- 110Mgpy expandable to 220Mgpy
- Key permits in hand
- \$20M in grants
- Site lease executed with Port Authority
- Mississippi River location provides logistics options for diverse feedstocks and product output

Business Overview

Cellulosic technology platform

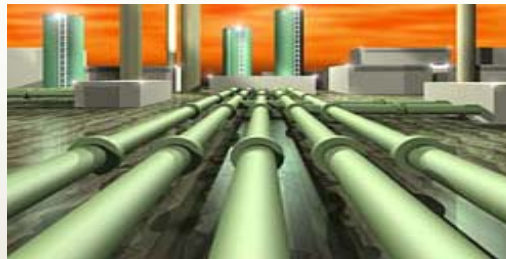


Led by Dr. Mohammed Moniruzzaman and a world-renowned team of molecular biologists, engineers, and chemists, BioEnergy uses its proprietary technology to advance the development of its cheap sugar platform.

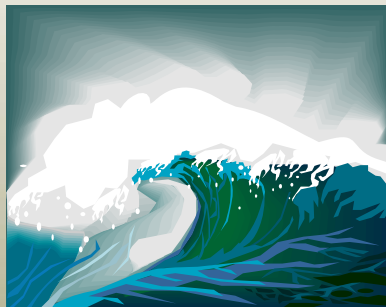
Innovative, Integrated Cellulosic Platform site as important as technology



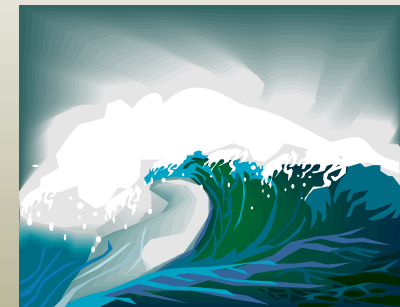
The road to low cost fuels is in the feedstock...



1st wave technology:
Grain based



2nd wave technology:
Organic waste based



< Different technologies,
different strategies

The gap is closing fast

Site and Business plan as important
as technology >

Today

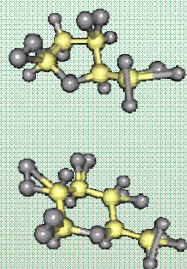
2009

BioEnergy's Biorefinery Technology



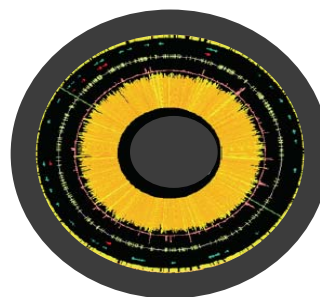
The source

- Bagasse
- Rice straw
- Wood chips
- Paper Sludge



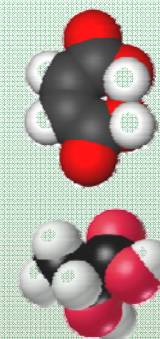
The feedstock

- C6 sugars
- C5 sugars



The technology

- Metabolic Engineering
- Directed Evolution
- Process Integration

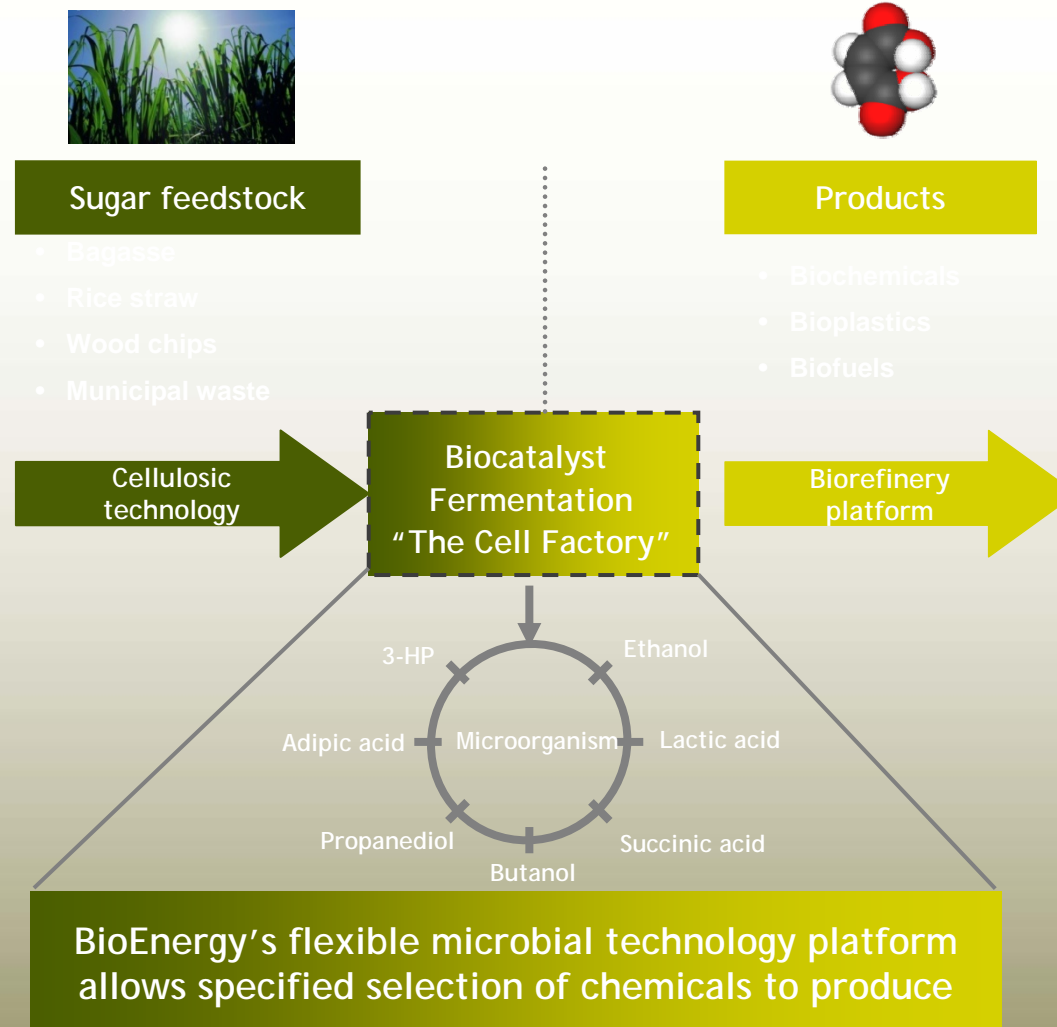


The product

- High value fuels & chemicals:
- Lactic acid
 - Succinic acid
 - Butanol
 - Butanediol

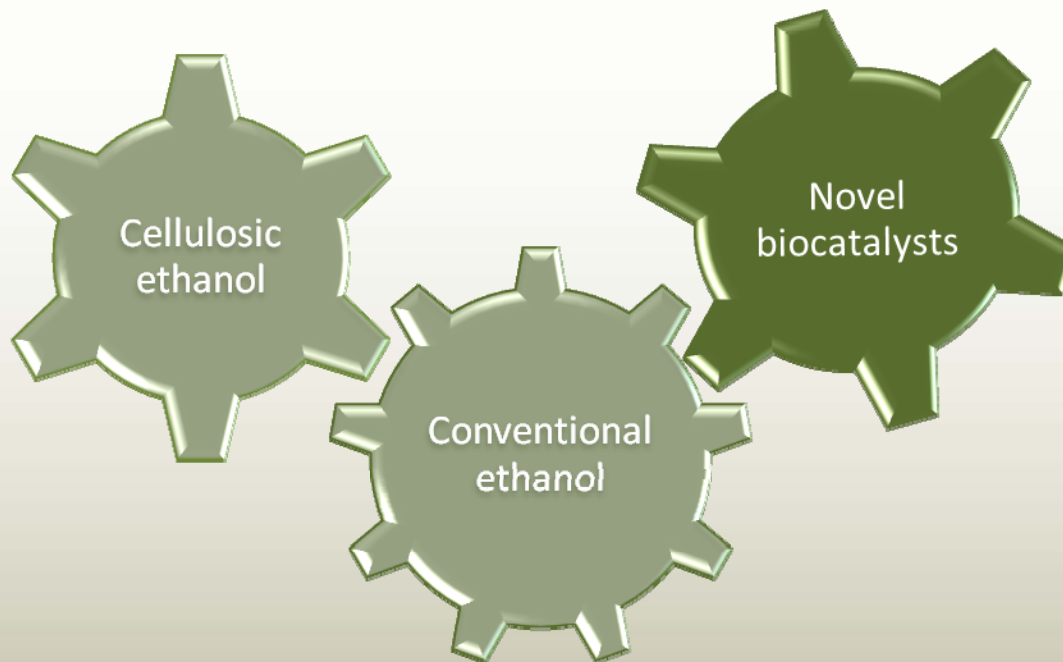
BioEnergy's "software" will convert Today's "hardware" into Tomorrow's biorefineries.

Revolutionary technology - BioEnergy's "software" will convert today's "hardware" into tomorrow's biorefineries



Business Overview

Novel Biocatalysts



Through the development of novel biocatalysts for use in state-of-the-art biorefineries, BioEnergy has pioneered a progressive, sustainable, and economically viable alternative to the traditional petroleum-based production of renewable fuels and high-value bio-based intermediates and polymer precursors.

Commercial D-lactic acid



BIOPLASTIC

PURAC PDLA

BENEFITS

PLA plastics with HDT B (0.45MPa) values >100°C possible

New applications with better heat stability possible

More efficient in injection molded PLA

Bulk density of PLA unchanged



IMPROVING HEAT-RESISTANCE OF PLA USING POLY(D-LACTIDE)

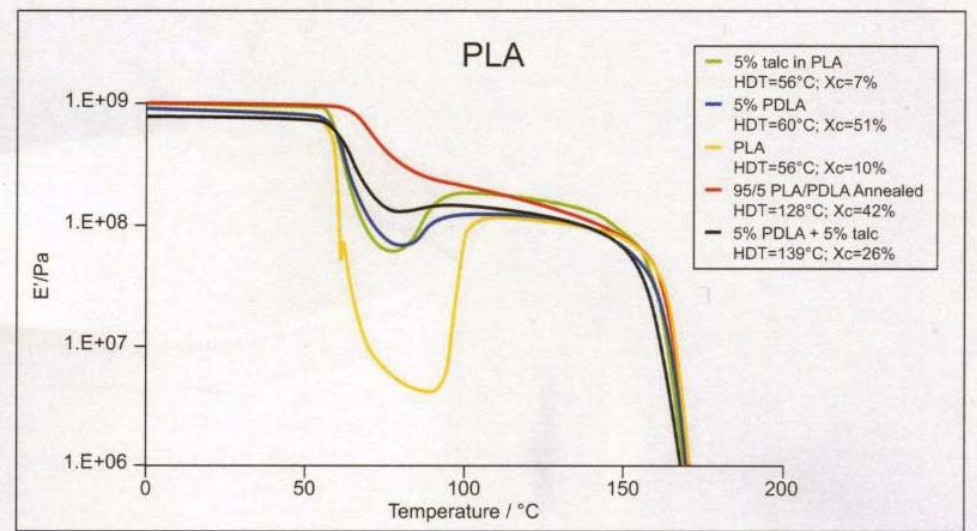
PLA (Poly L-Lactide) is a bioplastic derived from annually renewable carbohydrate resources. PLA has conquered a promising market volume and is growing fast. The semi-crystalline biopolymer has mechanical properties comparable to polystyrene and is being used as an eco-friendly packaging material. However, the adoption and growth of PLA is currently limited by a number of technical challenges. The most prominent material property of PLA that needs improvement is the poor heat resistance. Heat-deformation of PLA already takes place at temperatures below 50°C. This poses major issues in storage, transport and use of pallets and finished articles. A solution for the low heat-stability while maintaining transparency would accelerate the acceptance of PLA and widen the application window.

Six years of innovative research and development at PURAC have resulted in the commercial availability of D(-)-lactic acid and D-lactide, the monomer that enables large-scale utilization of PDLA (Poly D-Lactide). Melt-mixing PLA in the presence of PDLA produces in-situ sc-PLA crystallites, which act as heterogeneous nuclei for PLA, resulting in faster crystallization and higher crystallinity upon cooling from the melt. Consequently, the material exhibits better mechanical and thermal properties, like lower shrinkage and improved heat resistance (HDT). A 50/50 mixture of PLLA and PDLA, the homopolymers of L(+) and D(-)-lactic acid, produces a semi-crystalline polymer with a melting temperature of 215-230°C, i.e., 50-80°C higher than PLA packaging grades. This sc-PLA (semi-crystalline PLA) is a suitable biopolymer for melt-spun fibers and biaxially stretched film.

About PURAC

- Global presence
- Efficient and secure supply chain
- Natural products with high quality standards
- Dedicated application expertise for customers

- BioEnergy broke the D-lactic acid code
- Product already in the market



BioEnergy's Novel Biocatalyst Platform Game Changer

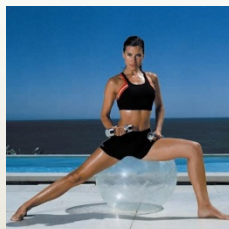


1,4 Butanediol

35 % THF



29 % PBT
(polyester)



16% GBL



14% TPU

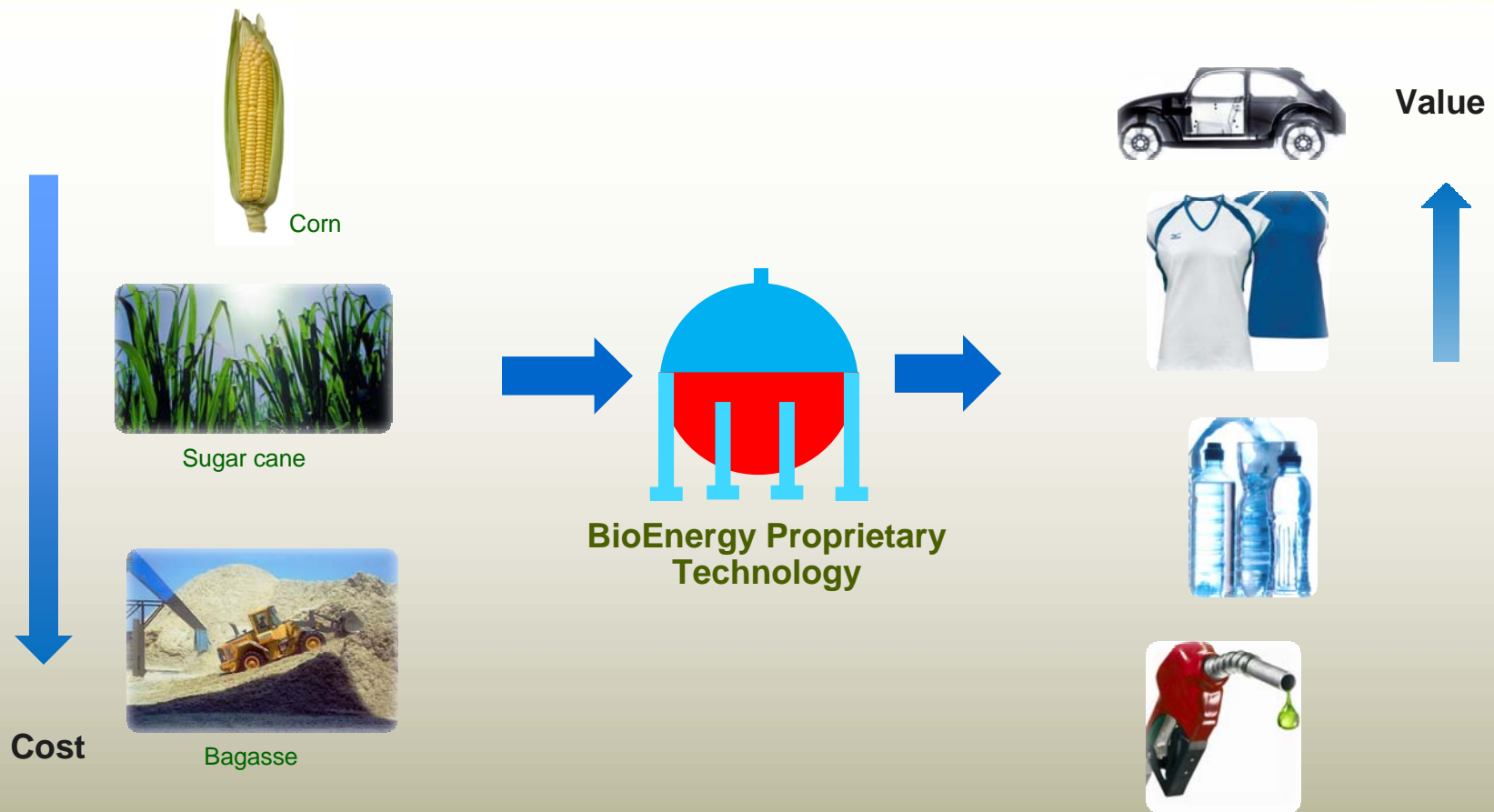


4% COPO



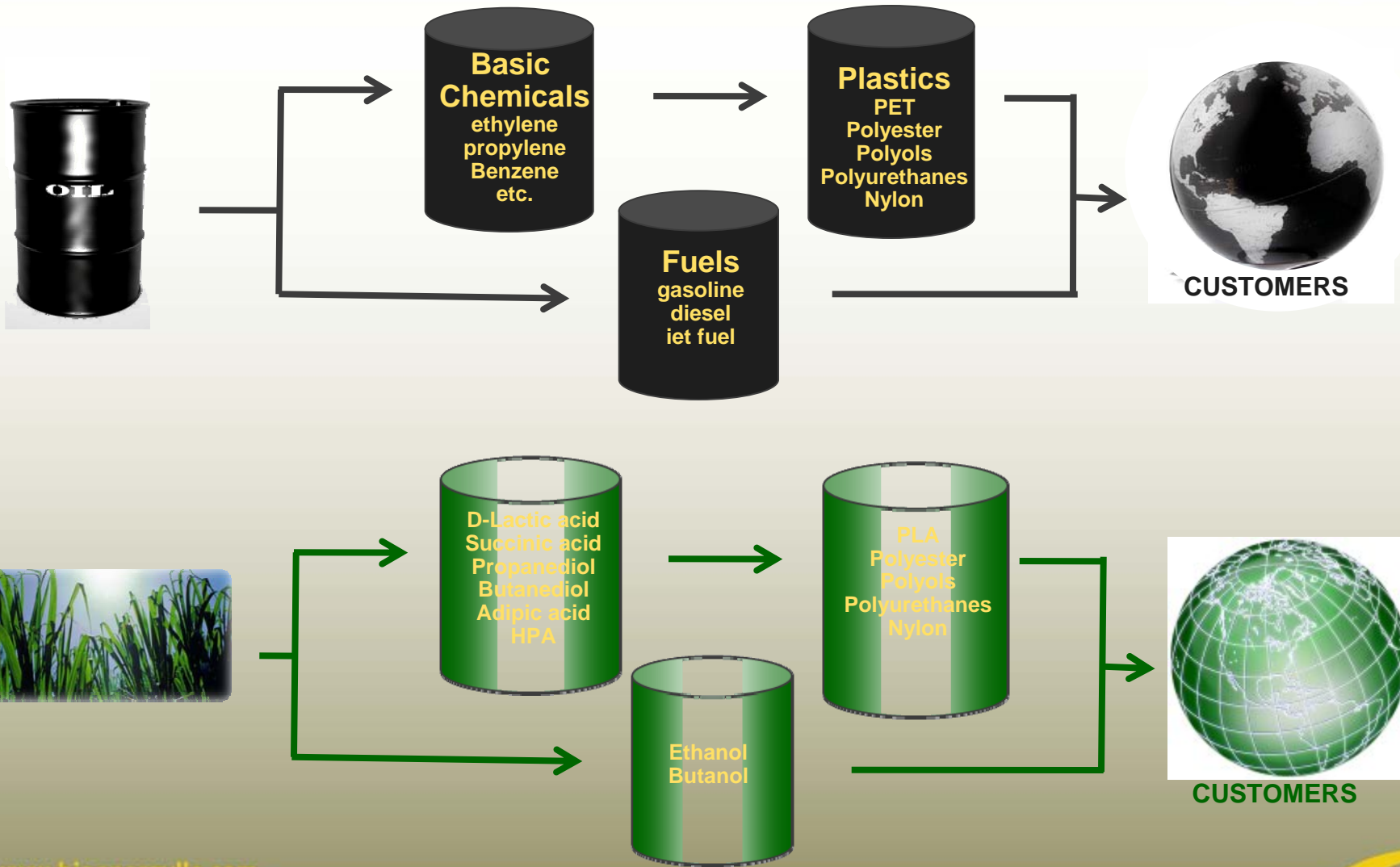
BioEnergy
product

Cost versus Value



Transforming the fuels, chemicals and energy industries with biotechnical advantage to push down cost and increase value

Status Quo of Oil is Unsustainable



Thank You

Corinne Young, Director of Government Affairs

BioEnergy International, LLC